

# ANN model

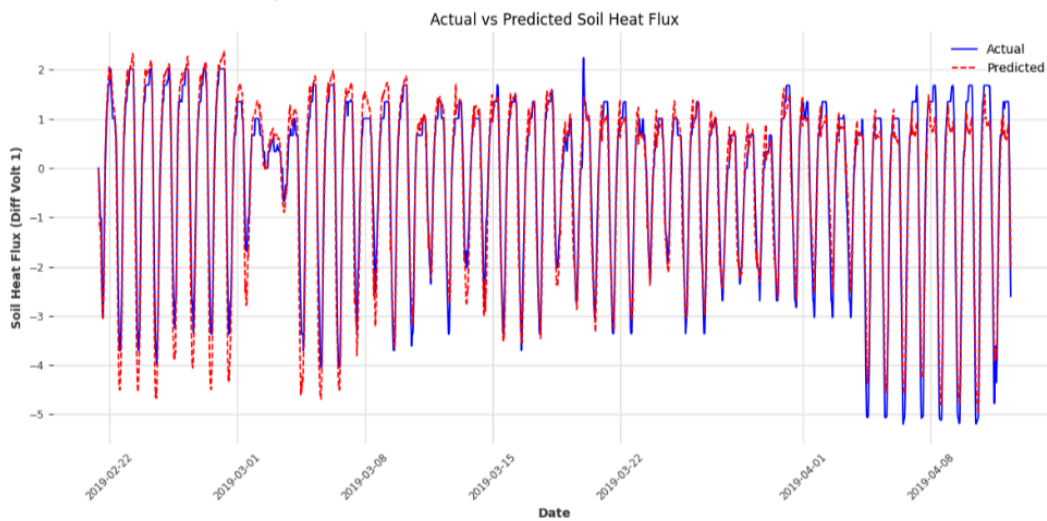
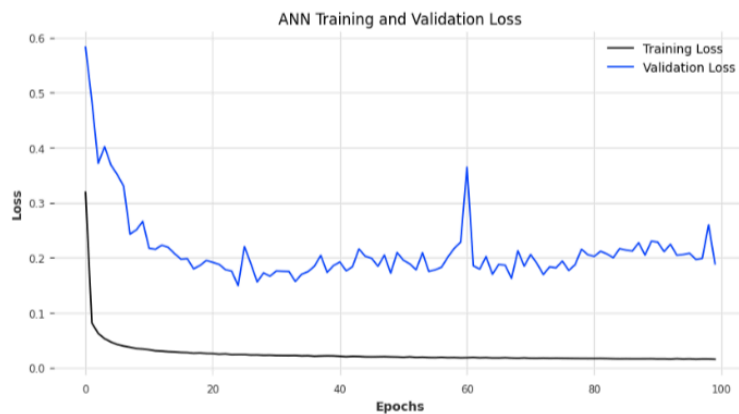
## Model config

```
# Build the ANN model
model = Sequential()
model.add(Dense(64, activation='relu', input_dim=X_train.shape[1]))
model.add(Dense(32, activation='relu'))
model.add(Dense(1, activation='linear')) # Output layer for regression

# Compile the model
model.compile(optimizer='adam', loss='mse')

# Train the model
history = model.fit(X_train, y_train, validation_data=(X_val, y_val), epochs=100, batch_size=32, verbose=1)
```

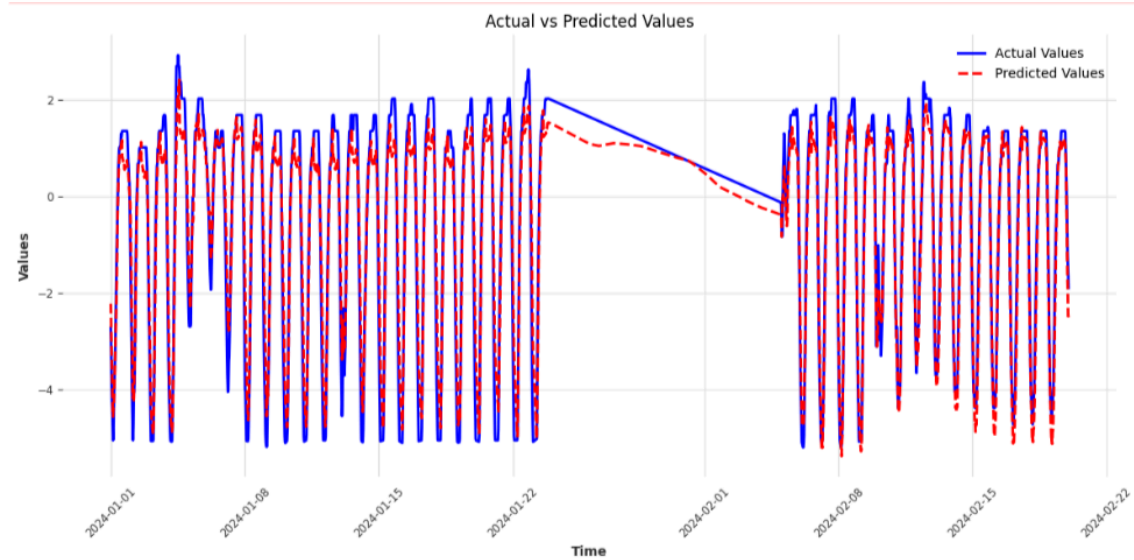
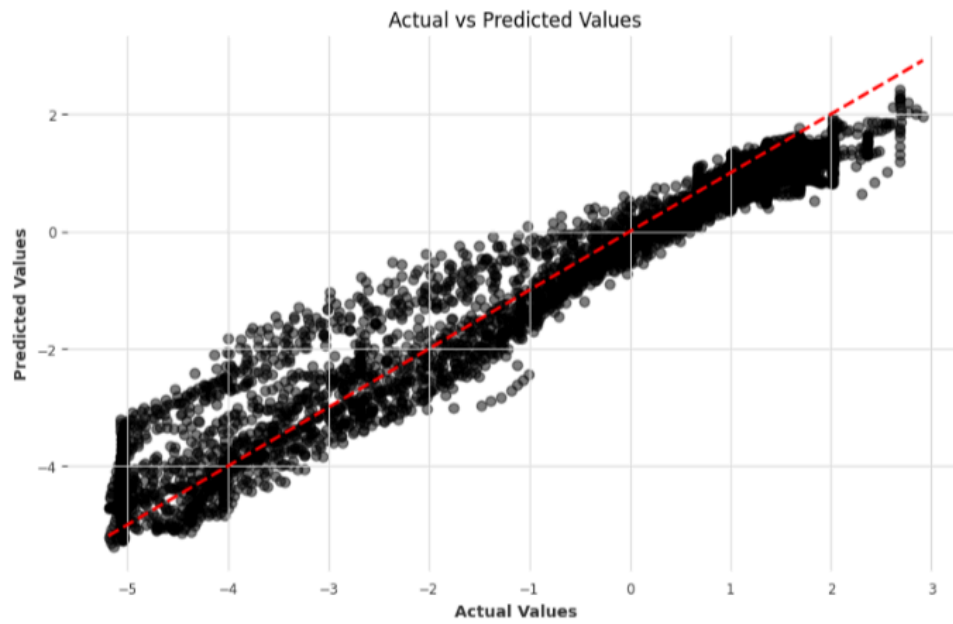
## 100 epochs



Mean Squared Error (MSE): 0.18900511791014019  
Root Mean Squared Error (RMSE): 0.4347471885017086  
Mean Absolute Error (MAE): 0.333046834083205  
R<sup>2</sup> Score: 0.9355561673794777

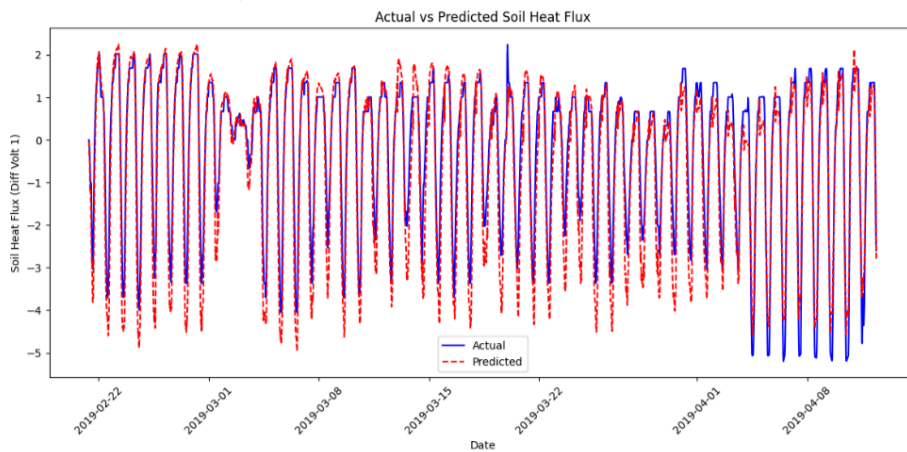
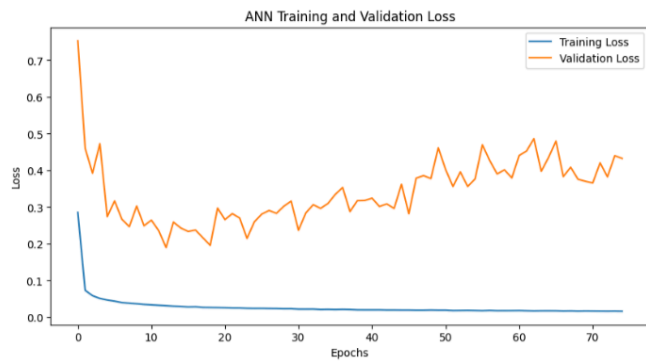
226/226 ———— 0s 1ms/step  
Test MSE: 0.28851032750320205  
Test RMSE: 0.537131573735153  
Test MAE: 0.4124872263059489  
Test  $R^2$ : 0.9409141990682449

Testing dataset



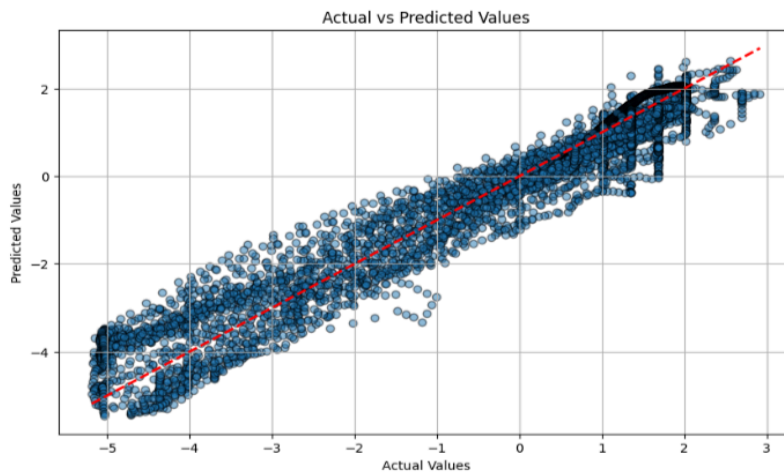
**Accuracy : 93.56%**

75 epochs

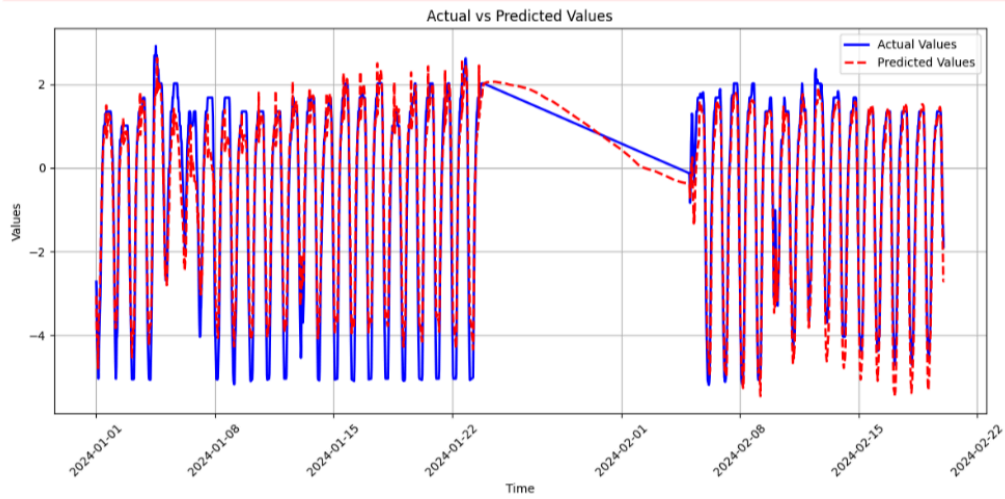


Mean Squared Error (MSE): 0.43237158984452106  
Root Mean Squared Error (RMSE): 0.6575496862173391  
Mean Absolute Error (MAE): 0.4854422918489825  
R<sup>2</sup> Score: 0.8525771012240163

226/226 0s 1ms/step  
Test MSE: 0.30601997744356624  
Test RMSE: 0.5531907242927762  
Test MAE: 0.41510391864350754  
Test R<sup>2</sup>: 0.937328290377508

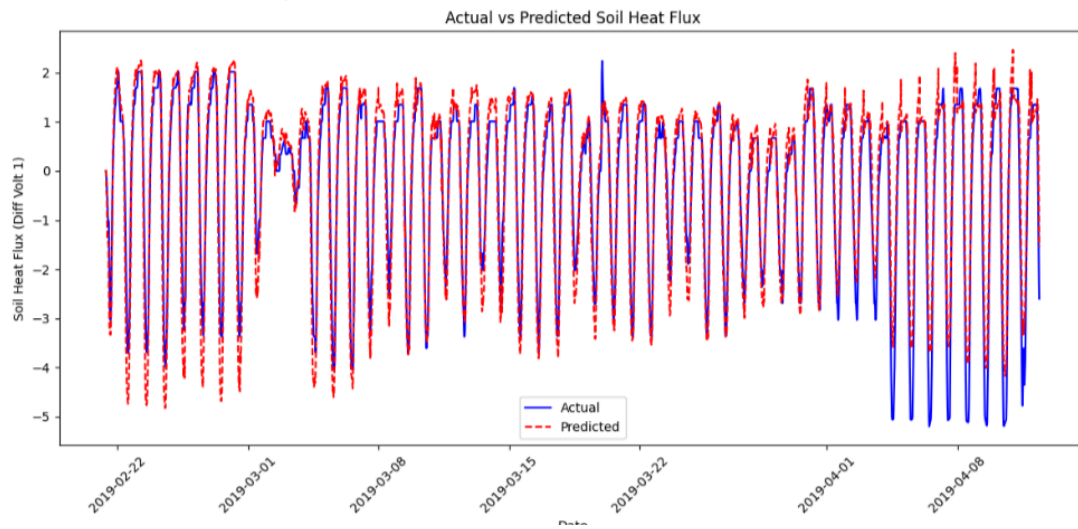
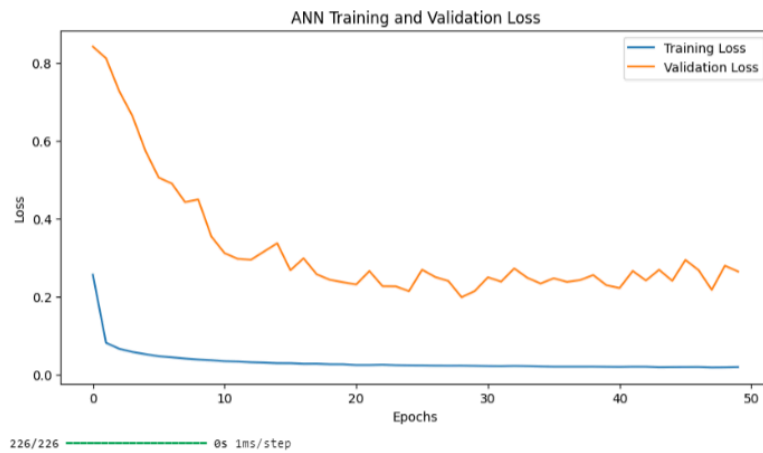


## Testing dataset



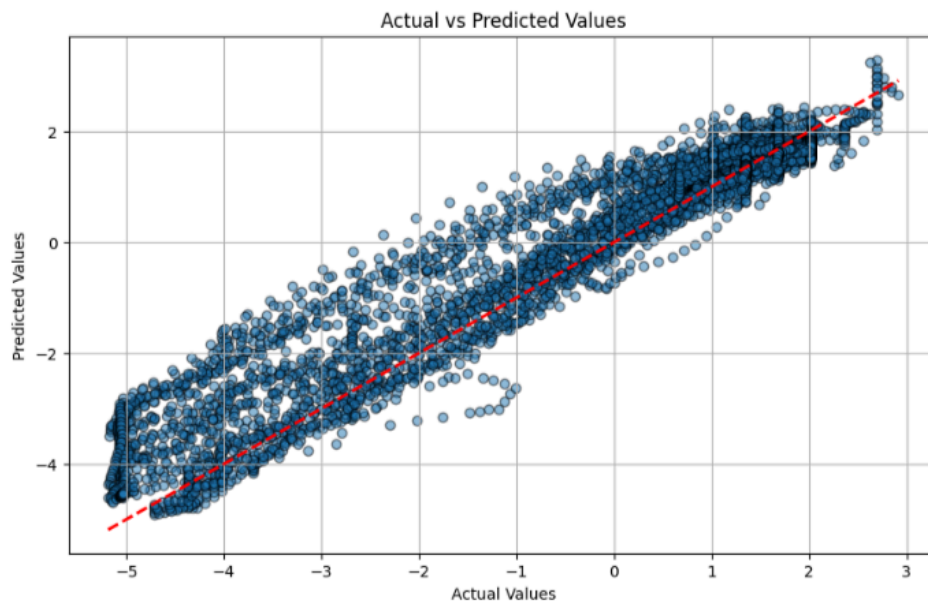
**Accuracy : 85.26%**

50 epochs

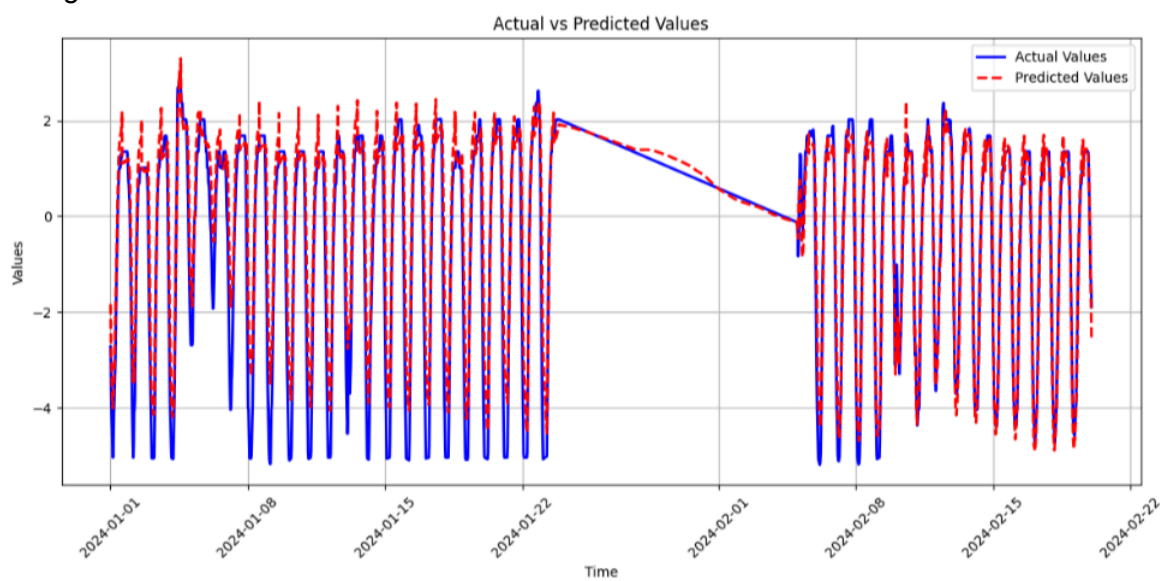


Mean Squared Error (MSE): 0.26497209709370506  
Root Mean Squared Error (RMSE): 0.514754404637498  
Mean Absolute Error (MAE): 0.3889720119950663  
R<sup>2</sup> Score: 0.9096542058594732

Test MSE: 0.4318916903089216  
Test RMSE: 0.6571846698675508  
Test MAE: 0.4226894458953635  
Test R<sup>2</sup>: 0.911550249661725

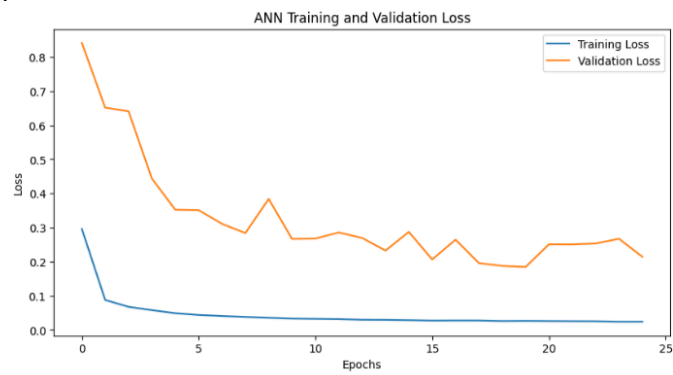


Testing data

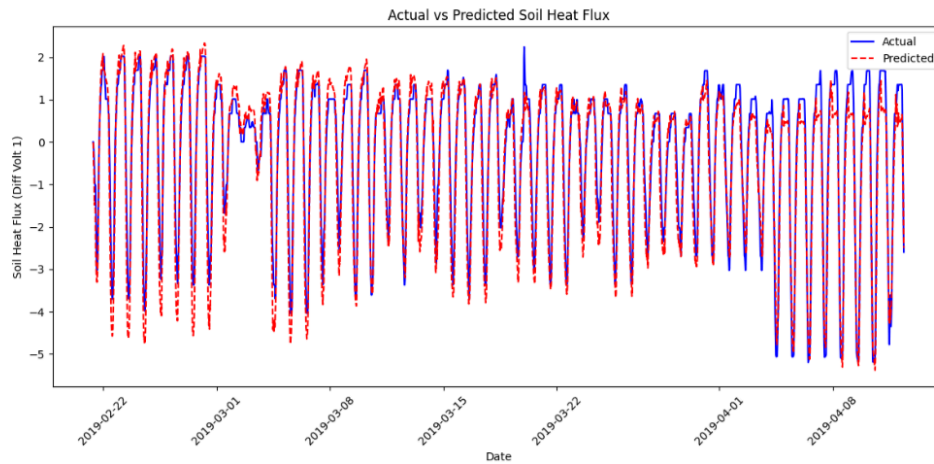


**Accuracy : 90.97%**

25 epochs



226/226 — 0s 1ms/step

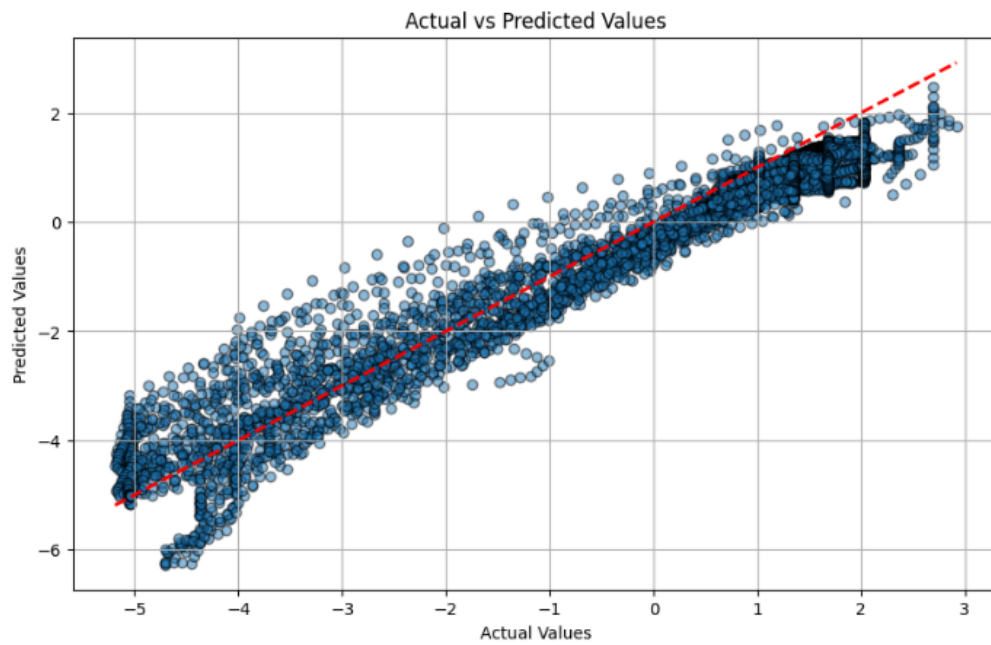


Mean Squared Error (MSE): 0.2141731891036009  
Root Mean Squared Error (RMSE): 0.4627884928383601  
Mean Absolute Error (MAE): 0.35725179795288825  
R<sup>2</sup> Score: 0.9269747755880453

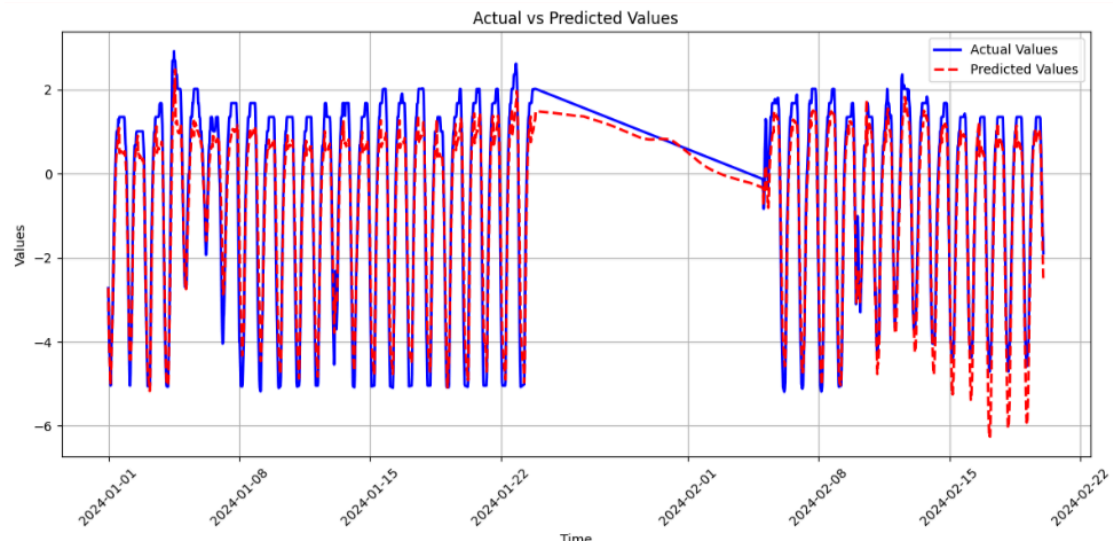
226/226 — 0s 1ms/step

Test MSE: 0.3305579944142386  
Test RMSE: 0.5749417313208692  
Test MAE: 0.46645498498066307  
Test R<sup>2</sup>: 0.9323029992604228





Testing data



**Accuracy : 92.70%**

## Tabulation

Epochs	MSE	RMSE	MAE	R^2 (%)
100	0.2885	0.5371	0.4124	93.56
75	0.3060	0.5531	0.4151	85.26
50	0.4318	0.6571	0.4226	90.97
25	0.3305	0.4627	0.4664	92.70